

ELECTRICAL ENGINEERING - PRE-MED OPTION

Our Department offers a pre-medical option that allows motivated students to obtain the rigorous education of a bachelors degree in electrical engineering while simultaneously completing the basic science requirements necessary for applying to medical or dental school. Much of the excitement in engineering involves applications of electrical and computer engineering to problems in health, such as the development of nano-scale biosensors, or the signal processing analysis of DNA sequences. The pre-med option allows students to learn the fundamentals of Electrical and Computer Engineering while preparing them for entry into either medical school, advanced graduate study, or industry.

Curriculum Requirements

Code	Title	Credit Hours
ECE 111	Introduction to Engineering I	3
ECE 112	Introduction to Engineering II	2
ECE 118	Introduction to Programming	3
ECE 201	Electrical Circuit Theory	3
ECE 202	Electronics I	3
ECE 203	Electrical Circuits Laboratory	1
ECE 206	Circuits, Signals, and Systems	3
ECE 211	Logic Design	3
ECE 212	Processors: Hardware, Software, and Interfacing	3
ECE 218	Data Structures	3
ECE 302	Electronics II	3
ECE 303	Electronics Laboratory	1
ECE 315	Digital Design Laboratory	1
ECE 316	Structured Digital Design	1
ECE 336	Discrete-Time Signals and Systems	3
ECE 481	Senior Project I	1
ECE 482	Senior Project II	2
EE Core Electives		6
ECE Design Elective		3
Engineering and Technical Electives		
ECE Elective		3
Technical Elective		3
Other Courses		
Math & Basic Science Credit Hours		
ECE 310	Introduction to Engineering Probability	3
MTH 151	Calculus I for Engineers	5
MTH 162	Calculus II	4
MTH 210	Introduction to Linear Algebra	3
MTH 311	Introduction to Ordinary Differential Equations	3
PHY 221	University Physics I	3
PHY 222	University Physics II	3
PHY 224	University Physics II Lab	1
PHY 223	University Physics III	3
PHY 225	University Physics III Lab	1
Biology and Chemistry Credit Hours		
BIL 150	General Biology	4
BIL 151	General Biology Laboratory	1
BIL 160	Evolution and Biodiversity	4
BIL 161	Evolution and Biodiversity Laboratory	1
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
CHM 221	Introduction to Structure and Dynamics	4

CHM 205	Chemical Dynamics Laboratory	1
CHM 222	Organic Reactions and Synthesis	4
CHM 206	Organic Reactions and Synthesis Laboratory	1-2
Advanced BioScience Elective		3
General Education Credit Hours		
ENG 105	English Composition I	3
ENG 107	English Composition II: Science and Technology	3
Arts and Humanities Cognate		9
People and Society Cognate		9
Total Credit Hours		135-136

Suggested Plan of Study

Course	Title	Credit Hours
Freshman Year		
Fall		
ECE 111	Introduction to Engineering I	3
ENG 105	English Composition I	3
MTH 151	Calculus I for Engineers	5
PHY 221	University Physics I	3
AH Cognate (Humanities and Arts Elective) ⁴		3
Credit Hours		17
Spring		
ECE 112	Introduction to Engineering II	2
ENG 107	English Composition II: Science and Technology	3
MTH 162	Calculus II	4
PHY 222	University Physics II (Substitutes PHY 206)	3
PHY 224	University Physics II Lab	1
CHM 121	Principles of Chemistry	4
Credit Hours		17
Sophomore Year		
Fall		
ECE 118	Introduction to Programming	3
ECE 201	Electrical Circuit Theory	3
MTH 311	Introduction to Ordinary Differential Equations	3
PHY 223	University Physics III (Substitutes PHY 207)	3
CHM 113	Chemistry Laboratory I	1
BIL 150	General Biology	4
BIL 151	General Biology Laboratory	1
Credit Hours		18
Spring		
ECE 202	Electronics I	3
ECE 203	Electrical Circuits Laboratory	1
ECE 206	Circuits, Signals, and Systems	3
PHY 225	University Physics III Lab	1
CHM 221	Introduction to Structure and Dynamics	4
BIL 160	Evolution and Biodiversity	4
BIL 161	Evolution and Biodiversity Laboratory	1
Credit Hours		17
Junior Year		
Fall		
ECE 211	Logic Design	3
ECE 218	Data Structures	3

ECE 302	Electronics II	3
ECE 303	Electronics Laboratory	1
ECE 336	Discrete-Time Signals and Systems	3
CHM 222	Organic Reactions and Synthesis	4
CHM 205	Chemical Dynamics Laboratory	1
Credit Hours		18
Spring		
ECE 212	Processors: Hardware, Software, and Interfacing	3
ECE 310 or IEN 310	Introduction to Engineering Probability or Introduction to Engineering Probability	3
ECE 315	Digital Design Laboratory	1
MTH 210	Introduction to Linear Algebra	3
CHM 206	Organic Reactions and Synthesis Laboratory	2
Advanced Bioscience Elective ²		3
PS Cognate (People and Society Elective) ⁴		3
Credit Hours		18
Senior Year		
Fall		
ECE 316	Structured Digital Design	1
ECE 481	Senior Project I	1
EE Design Elective ¹		3
EE Core Elective ¹		3
EE Core Elective ¹		3
People and Society Cognate ⁴		3
Arts and Humanities Cognate ⁴		3
Credit Hours		17
Spring		
ECE 482	Senior Project II	2
ECE Elective		3
Technical Elective ¹		3
Arts and Humanities Cognate ⁴		3
People and Society Cognate ⁴		3
Credit Hours		14
Total Credit Hours		136

¹ See description of electives under the Departmental Electives Section.

² Advanced Bioscience Elective is to be chosen from BMB 260 (<http://bulletin.miami.edu/search/?P=BMB%20260>) BIL 250 (<http://bulletin.miami.edu/archives/2016-2017/search/?P=BIL%20250>), BIL 255 (<http://bulletin.miami.edu/archives/2016-2017/search/?P=BIL%20255>), BIL 268 (<http://bulletin.miami.edu/archives/2016-2017/search/?P=BIL%20268>), or BMB 401 (<http://bulletin.miami.edu/search/?P=BMB%20401>), in consultation with their academic advisor. Students should verify admission requirements of their medical school of interest to verify Adv. Bioscience requirements.

³ Offered only in the Fall semester.

⁴ Students in the Premed Concentration are highly encouraged to choose cognates that include PSY 110 (<http://bulletin.miami.edu/archives/2016-2017/search/?P=PSY%20110>) and SOC 101 (<http://bulletin.miami.edu/archives/2016-2017/search/?P=SOC%20101>).

Mission

The mission of the Department of Electrical and Computer Engineering is to achieve and maintain, through a continuous improvement process, excellence in undergraduate and graduate education, research, and service to the community and the nation. We endeavor to accomplish this by providing high-quality education and research programs which will impart the requisite knowledge and skills to our students enabling them to assume leadership roles in contributing to the advancement of the underlying electrical and computer engineering technologies which sustain the current world economy, to promote a strong commitment to life-long learning, to prepare them for a variety of alternative career paths and to participate as responsible citizens in a rapidly changing and shrinking global community.

Program Educational Objectives

We expect that the alumni of the Electrical Engineering Program will exhibit the following:

1. Successful careers in dynamic and multidisciplinary fields with the ability to apply electrical engineering practices within societal, global, and environmental contexts in an ethical manner.
2. Demonstrating life-long learning through activities such as completion of graduate studies and/or professional development.

Student Learning Outcomes

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.